



EFFECTIVENESS OF E-LEARNING TECHNIQUES ON PUPILS' ACHIEVEMENTS FOR THE TOPIC IN ENVIRONMENTAL EDUCATION STUDYING AT SECONDARY LEVEL

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ABSTRACT

This paper presents an e-learning material and its design process which goal is to support environmental Education learning in the context of insect Environment Education Unit-I through e-learning.

Emerging technologies of communication and information influence the society, in particular the Educational system in new directions. Media based educational systems are becoming more popular today and vast student population rely on this for learning. Teacher education is playing important role in present education system. The present study was focused on the effectiveness of pedagogical Analysis teaching, for the present study researcher selected the sample of 40 students studying in 9 (IXth) class i.e. secondary levels. For the study the effectiveness of pedagogical analysis teaching experimental method for comparing two teaching methods. From this study researcher found high achievement towards pedagogical analysis science and Technology subject. Teaching and learning process is very essential in Education. Effective learning is depends on Effective teaching. The density of India is being shaped in its classrooms' –Dr.J.P.Naik. Effectiveness of Teaching-learning process new trends, techniques is an effective medium. We create the environment and situation for students which encourage them too independently.

KEYWORDS: e-learning technology, Learning activity, teacher (Guru) role, entry behavior, pooled standard deviation, Environmental Education.

INTRODUCTION:

Our research is focused on applying knowledge modeling and artificial intelligence techniques in the area of e-learning. Education is the only mean through which a society adjusts with its needs and therefore a society can never exist without education. Teaching learning process has been inseparable to human being since ancient times. Teachers can bring enthusiasm and varied teaching and assessment approaches to the classroom, addressing individual students' needs and ensuring sound learning opportunities for every student. Understanding the nature of school climate is a basic element in improving schools. Our research is focused on applying knowledge modeling and appropriate techniques in the area of e-learning

INNOVATIONS IN LEARNING AND TEACHING LEARNING:

Learning is an individual single activity. It occurs privately and at the initiative of the single person the learner. The goals of the learning are the outcomes of teaching. Learning is the result. Learning is a highly individualistic act to fulfill the needs and interests of the learner himself. Learning implies accomplishment. It indicates the success or achievement of purpose some believe that learning is the result which occurs due to effects of teaching. Anyhow, learning depends upon the learning style of the student and content.

TEACHING:

Teaching consist of a group of complex but interrelated set of activities such as lecturing, telling, demonstrating, giving, Instructions, directions, encouraging, praising, confirming or correcting pupil's responses. The goals of teaching are pre-determined objectives of instruction. Teaching is the social act designed for the benefits of the learner. Teaching is an intentional purposive act. Teaching is a task which causes learning to take place. Teaching is performed by teacher involving skills and competencies. Nowadays the teacher (Guru) role as changed a lot. He is a guide on the side and a sage on the stage.

EDUCATIONAL TECHNOLOGY:

Man is a highly enterprising being. He is always on the lookout for inventing new innovations in all walks of life. Human life has improved tremendously as a result of the growth in science and technology. Education is a social institution that has also been influenced by technological developments. The impact of technology on education has been so profound that a new branch in the field of education called 'Educational technology' has been developed

LEARNING ACTIVITIES:

Learning activity should be provided in a planned and sequenced manner. These activities enable the learners to develop behavior in pre-determined direction, following some of the principle, which should be kept in mind while developing the learning activities:

1. The learning activities should be planned on the basis of the entry behavior of the learners. Entry behavior means the previous knowledge of the learner of the instructional objectives.

2. They should be based on the needs of the learner.
3. The learning should be based on the terminal behaviour i.e., the ultimate outcomes of the learning activities.
4. They should provide for individual differences. Provide activities for freedom and flexibility in the leaning process.
5. They should be of different types using different media and methodology.
6. They should be properly graded so that the learner proceeds step by step in the order of difficulty.
7. The methodology used in the learning activities should promote imagination, divergent thinking and creative innovative behavior on the part of the learners.

E-LEARNING:

An innovative application of computer in the teaching and learning process is e-learning that may be network based, which includes text, video, audio animation and virtual environments.

E-learning provides faster learning and clear accountability for all participants in the learning process.

CHARACTERISTICS OF E-LEARNING:

Each learner progresses at his own pace without fear or favour i.e. he does not face or bear humiliation from outside. The content and sequence of frames can be revised according to the taste, speed and style of learning of learners. There is immediate confirmation of right response. Learners are given chances to eliminate wrong response with the help of linear programming. The raw subject matter is broken into easily digestible particle i.e. small easy steps called frames, which can be arranged sequentially. It is apparent and clear that computerized systems of instruction which have come into vogue are also based on skinner's operant conditioning principles.

USES OF E-LEARNING:

An innovate application of computer in the teaching and learning process is E-learning. E-learning may be network-based, which includes text, video, audio, animation and virtual environments. E-learning may be stated in the following ways. E-learning is learning on internet time-learning uses the power of networks, primarily those that rely not only on internet technologies but also satellite networks, and digital content to enable learning.

CONVENTIONAL METHOD AND E-LEARNING:

We have always used a variety of sources, mediums and events to learn. The conventional definition of training has perhaps been something that takes place with in a class room or computer-based course, but we have always supplemented

these course, albeit informally, by means of articles we read, conferences and seminars that we attend, presentations from subject experts, interaction with our colleagues and with acknowledged experts, projects we undertake and tests and assessments we perform. And the ultimate e-learning content available today combines all of these learning events and resources into integrated learning paths that vary according to the student, the subject material, the level of competence and corporate or student preference below that mention.

PARADIGM FOR E-ELEARNING:

Self instructional material is gradually taking in the shape of E-learning material in the present day knowledge today. E-learning is being promoted for its cost-effective and convenient with increasing opportunities for lifelong learning. It has demonstrated several advantages over traditional learning especially in promoting learning at anytime and anywhere. we undertake and tests and performance assessments and the ultimate E-learning content available today combines all of these learning events and resources into integrated learning paths that vary according to the students the subject material, the level of competence of the institution or students preferences.

GENERAL OBJECTIVES OF TEACHING ENVIRONMENTAL EDUCATION AT SECONDARY LEVEL

- To understand the concept of Environmental and Ecology.
- To understand the nature and scope of Environmental Education.

SECONDARY LEVEL:

To provide secondary school students with greater access to information, to expand their knowledge, skills and also make them technological competent we should implement ICT for secondary school students, which falls between IX & X.

ACHIEVEMENT:

This is related to the academic performance due to the new exposure or treatment. The learning style of the students can be gauged in the right perspective, with the result of the achievement tests.

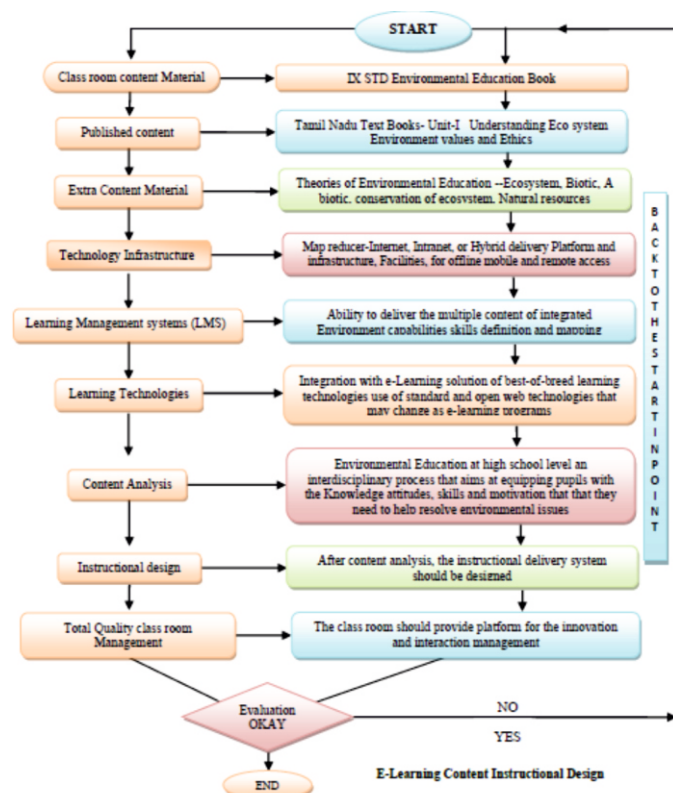
OBJECTIVES OF THE STUDY:

- To analyze various set of dimensions for the Environmental Education at secondary level.
- To validate the evolved E-learning materials for the topic Environmental Education for the learners at secondary level.

SAMPLE:

This experiment deals with the sample of 40 students studying in 2 secondary schools each 20 students out of 187 Higher secondary Schools in the Thanjavur district of Tamilnadu.

DEVELOPMENT OF E-LEARNING CONTENT INSTRUCTIONAL DESIGN



TOOLS FOR THE STUDY:

The following tools were used in the study

- Achievement Test in E-learning technique in Environmental Education was constructed and validated by the researcher.

VARIABLES OF THE STUDY:

- The Independent variable is the E-learning technique.
- The Dependent variable is the Achievement in Understanding Ecosystem Environmental values and Ethics.

METHODOLOGY IN BRIEF:

To study the Effectiveness of E-learning technique strategy, the pre-test, Treatment, post-test equivalent group experimental design was adopted in the study.

RELIABILITY:

Reliability means the degree to which a test measures which are always consistent. This indicates that as long as the test measures are consistently something the test is a reliable one. A reliable test would definitely yield consistent results if it is administered any number of items to the different groups of equal level. The investigator adopted the test-retest method to establish the reliability of the criterion test. The scores of the twenty students have been used for establishing the reliability of the test.

VALIDITY:

Validity is most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure. Validity can also be thought of as utility. The tool was evaluated by the subject experts. Their opinion indicates that the tool has content validity.

STATISTICAL TECHNIQUES USED IN THE STUDY:

Differential analysis - 't'-test (using pooled deviation)

POOLED STANDARD DEVIATION:

The pooled standard deviation is a method for estimating a single standard deviation to represent all independent samples or groups in your study when they are assumed to have a common standard deviation. The pooled standard deviation is the average spread of all data points about their group mean. It is a weighted average of each group's standard deviation. The weighing gives larger groups a proportionally greater effect on the overall estimate. Pooled standard deviations are used in t-tests, ANOVAs, control charts, and capability analysis.

For the present investigation the 't' test formula employed is

$$t\text{-TEST: } SD = \sqrt{\frac{\sum (X_i - M_1)^2}{N - 1}} \quad t = \frac{M_1 - M_2}{\sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}}$$

Where

M_1, M_2 = Means of groups

σ_1, σ_2 = Standard deviations of each group

N_1, N_2 = Total number of sample in each group

The statistical treatment was carried to verify the framed hypotheses

HYPOTHESES OF THE STUDY:

- There is no significant difference between the means of Experimental group-1 which is exposed to the developed E-learning technique and the control group which is taught through the conventional Talk & Chalk method for IX standard students in their pre test achievement level for the topic Understanding Eco system Environmental Values and Ethics in Environmental Education.
- There is no significant difference between the means of Experimental group - I which is exposed to the developed E-learning technique and the Control group which is exposed to the conventional Talk & Chalk method for IX standard students in their post-test achievement level for the topic Understanding Ecosystem Environmental Values and Ethics in Environmental Education.

E-LEARNING TECHNIQUES EXPOSED TO THE EXPERIMENTAL GROUP:

The experimental group of the standard IX were taught by the E-learning for the selected Environmental education topics. The investigator taught the experimental groups by the e-learning techniques. First the experimental group was taught through individual and then it was divided into four different groups each having five students. Each group has above average, average and below average students. This division of students into different groups was based on the average marks obtained in Environmental education in the quarterly, half yearly and annual examinations in the previous academic year. Fourteen periods each has 45 minutes duration were taken for completing the topics through E-learning techniques.

ACHIEVEMENT TEST AND SCORING KEY:

The answer sheets of the students for the Achievement test were collected. One mark was given to each objective type questions, and thus given the maximum scores as fifty marks. The range of the scores secured by the students in the pre-tests and post-tests were zero to fifty

ANALYSIS OF SCORES OF THE PRE-TESTS IN RESPECT OF ACHIEVEMENT:

**Table 1: Experimental Group [E-Learning]
Understanding Ecosystem Environmental Values and Ethics**

S. NO	X_i	$(X_i - M_i)$	$(X_i - M_i)^2$
1	12	-3.75	14.06
2	17	1.25	1.56
3	15	0.75	0.56
4	17	1.25	1.56
5	12	-3.75	14.06
6	14	-1.75	3.06
7	15	0.75	0.56
8	19	3.25	10.56
9	18	2.25	5.06
10	18	2.25	5.06
11	16	0.25	0.06
12	14	-1.75	3.06
13	19	3.75	14.06
14	14	-1.75	3.06
15	16	0.25	0.06
16	14	-1.75	3.06
17	18	2.25	5.06
18	15	0.75	0.56
19	17	1.25	1.56
20	15	0.75	0.56
TOTAL	315		87.20

$$M = \frac{315}{20} = 15.75$$

$$M=15.75$$

$$SD=2.12$$

$$SD = \sqrt{\frac{\sum (X_i - M_i)^2}{N-1}} = \sqrt{\frac{87.20}{19}} \quad SD = 2.12$$

**Table 1.1: Pre-Test Scores of Control Group [Talk & Chalk Method]
Unit-I Understanding Ecosystem Environmental Values and Ethics**

S. NO	X_i	$(X_i - M_i)$	$(X_i - M_i)^2$
1	12	-0.6	0.36
2	14	1.4	1.96
3	11	1.6	2.56
4	10	-2.6	6.76
5	12	-0.6	0.36
6	17	4.4	19.36
7	12	0.6	0.36
8	14	1.4	1.96
9	16	3.4	11.56
10	12	0.6	0.36
11	15	2.4	5.76
12	12	0.6	0.36
13	09	-3.6	12.96
14	15	2.4	5.76
15	12	0.6	0.36
16	14	1.4	1.96
17	11	-1.6	2.56
18	09	-3.6	12.96
19	14	1.4	1.96
20	11	-1.6	2.56
TOTAL	252		108.84

$$M = \frac{252}{20} = 12.6$$

$$SD = \sqrt{\frac{\sum (X_i - M_i)^2}{N-1}} = \sqrt{\frac{108.84}{19}} = \sqrt{5.72} \quad SD = 2.39$$

$$M = 12.6$$

$$SD = 2.39$$

Hypothesis 1:

There is no significant difference between the means of Experimental group-I which is exposed to the developed E-learning technique and the control group which is taught through the conventional method Talk & Chalk for IX standard students in their pre test achievement level for the topic "Understanding Ecosystem Environmental Values and Ethics" in Environmental in Education

Table 1.1: Showing the mean, SD and 't' value of Experimental group – I which is exposed to the developed E-learning and the control group which is exposed to the conventional method IX standard students in their pre-test achievement level for the topic Understanding Ecosystem and Environment Values and Ethics in Environmental Education.

Name of the Group	N	Mean	P.S.D	SED	$M_1 - M_2$	Df	T
Experimental Group-I (Using E-learning technique)	20	15.75					
			2.27	0.717	3.15	2.71	4.39
Control Group (Using Conventional talk & chalk method)	20	12.6					

Not Significant at 0.01 level. (The tabular value 2.71 for the degree of freedom 38)

The table value of 't' at 0.01 level of significant is 1.96 The calculated value of 't' 4.39 is not significant at 0.01 level of significance. This makes it obligatory to accept the null hypothesis. It is concluded that there is no significant difference between the Experimental group – I which is exposed to the developed E-learning techniques and the control group which is exposed to the conventional method talk & chalk IX standard students in their pre-test achievement level for the topic 'Understanding Ecosystem and Environment Values and Ethics' in Environmental Education. The table also indicates that the performance of the two groups is almost in same level in the pre-test.

**Table 2.1: Post- Test Scores of Experimental Group I Using [E-Learning]
Understanding Ecosystem Environmental Values And Ethics**

S. NO	X_i	$(X_i - M_i)$	$(X_i - M_i)^2$
1	40	-3.5	42.8
2	46	2.5	6.25
3	41	2.5	6.25
4	46	2.5	6.25
5	42	-1.5	2.25
6	45	1.5	2.25
7	40	-3.5	42.8
8	45	1.5	2.25
9	47	3.5	42.8
10	44	0.5	0.25
11	48	4.5	20.25
12	42	-1.5	2.25
13	46	2.5	6.25
14	42	-1.5	2.25
15	45	1.5	2.25
16	44	0.5	0.25
17	41	2.5	6.25
18	44	0.5	0.25
19	42	-1.5	2.25
20	40	-3.5	42.8
TOTAL	870		239.65

$$M = \frac{870}{20} = 43.5$$

$$SD = \sqrt{\frac{\sum (X_i - M_i)^2}{N-1}} = \sqrt{\frac{239.65}{19}} = \sqrt{12.61} \quad SD = 3.55$$

$$M = 43.5$$

$$SD = 3.55$$

Table 2.2: Post- Test Scores of Control Group Using [Talk & Chalk Method]
Understanding Ecosystem Environmental Values and Ethics

S. NO	X _i	(X _i -M _i)	(X _i -M _i) ²
1	12	-5.3	28.09
2	19	1.7	2.89
3	17	-0.3	0.09
4	12	-5.3	28.09
5	21	3.7	13.69
6	17	-0.3	0.09
7	19	1.7	2.89
8	22	4.7	22.09
9	14	-3.3	10.89
10	20	2.7	7.29
11	16	-1.3	1.69
12	22	4.7	22.09
13	17	-0.3	0.09
14	19	1.7	2.89
15	19	1.7	2.89
16	18	0.7	0.49
17	11	-6.3	39.69
18	17	-0.3	0.09
19	15	-2.3	5.29
20	19	1.7	2.89
TOTAL	346		194.2

$$M = \frac{346}{20} = 17.3$$

$$SD = \sqrt{\frac{\sum (X_i - M_i)^2}{N-1}} = \sqrt{\frac{194.2}{19}} = \sqrt{10.21} \quad SD = 3.19$$

$$M=17.3$$

$$SD=3.19$$

Hypothesis 2:

There is no significant difference between the means of Experimental group – I which is exposed to the developed E-learning techniques and the control group which is exposed to the conventional method IX standard students in their post-test achievement level for the topic 'Understanding Ecosystem Environmental Values and Ethics' in Environmental Education.

Table 2.1. Showing the mean, SD and 't' value of Experimental group which is exposed to the developed E-learning techniques and the control group which is exposed to the conventional method Talk & Chalk IX standard students in their post-test achievement level for the topic 'Understanding Ecosystem Environmental Values and Ethics' in Environmental Education.

Name of the Group	N	Mean	P.S.D	SED	M ₁ -M ₂	Df	T
Experimental Group (Using E-learning)	20	43.5					
			3.37	1.04	26.2	2.71	25.19
Control Group (Using Talk & Chalk Method)	20	17.3					

Significant at 0.01 level. (The tabular value 2.71 for the degree of freedom 38)

The table value of 't' at 0.01 level of significant is 2.326

The calculated value of 't' 25.19 is significant at 0.01 level of significance. This makes it obligatory to reject the null hypothesis. It is concluded that there is significant difference between the Experimental group which is exposed to the developed E-learning techniques and the control group which is exposed to the conventional talk & chalk method for IX standard students in their post-test achievement level for the topic Understanding Ecosystem Environmental Values and Ethics in Environmental Education.

The table also indicates that the performance of the Experimental group – I which is exposed to the developed E-learning technique for IX standard students are at a high level than the control group which is exposed to the conventional Talk & Chalk method for IX standard students in their post-test achievement level

CONCLUSION:

The study reveals that the E-Learning technique is effective in teaching Environmental Education for the selected topics over the conventional talk &

Chalk method at the secondary school level The E-learning technique provides learning experiences with higher achievement for students. Most learning involves talk & Chalk methods and tones of words, which may not work very well for those who tend to retain memory better through visual cues. Students who were taught to use E-learning technique were encouraged to explore the relationship with ideas of their own and relate these and able to form number of branches and sub branches that emanate from a single central ideas. This strategy could facilitate better revision of learned material and it is an excellent group and individual activity, allowing for a lot of collaboration and enthusiastic innovations. Based on the discussions and conclusion, IX standard students who are having positive attitude towards E-learning technique could augment better achievement in Environmental Education for the topic Unit-I Understanding Ecosystem Environmental Values and Ethics. These learning techniques can excel distasteful traditional Talk and Chalk method, if they are prudentially and judiciously used in the Class room.

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